

PATENT ABSTRACTS OF JAPAN

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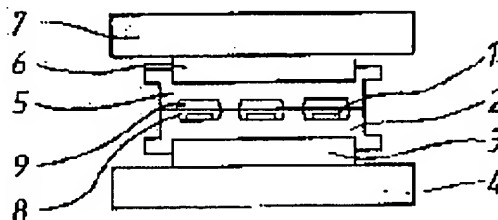
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(54) METHOD AND APPARATUS FOR INVERTING AND HOUSING SEMICONDUCTOR CHIPS

(57)Abstract:

PURPOSE: To invert all various chips in a tray and perfectly house them in a pocket by putting a first pocket of a first chip housing vessel above a second pocket of an empty second chip housing vessel face to face, slightly offsetting both pockets and rotating them to move the chips into the second pocket.

CONSTITUTION: A first tray which houses IC chips 1 is fixed by vacuum suction to a tray fixing table 3, thereby holding it on a stage 4. Second empty tray is similarly fixed to a tray fixing table 6, thereby holding it on a stage 7. The stop position of the horizontally movable stage 4 is adjusted to put a first picket 8 on a second pocket 9, this stage 4 is moved slightly to the right from the long side of the pocket to slightly shift the center of one pocket from that of the other. The entire is rotated 180deg. clockwise to house the chips 1 in the pocket 9 such that they run on to the pocket edge of the tray 5.



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CLAIMS

[Claim(s)]

[Claim 1] The 1st pocket of the 1st semiconductor chip stowage container with which the semiconductor chip was contained, So that said semiconductor chip may counter the 2nd pocket of the non-contained 2nd semiconductor chip stowage container Superposition, They are reversal moving [which removes receipt of said semiconductor chip by rotating the whole] a semiconductor chip, or the approach of acquiring. Reversal moving the semiconductor chip characterized by performing the revolution of changing said whose semiconductor chip moves said 1st pocket and said 2nd pocket in the condition, ZURA slightly, or the approach of acquiring.

[Claim 2] Reversal moving the semiconductor chip according to claim 1 characterized by performing the revolution of changing moved in the direction of clockwise in the revolving shaft which slightly said 1st semiconductor chip stowage container with which said semiconductor chip was contained, and took it to the pocket shorter side at parallel, or the approach of acquiring. [location / where said 1st pocket and said 2nd pocket overlap] [to the pocket long side] [in the direction of a right hand]

[Claim 3] Reversal moving the semiconductor chip according to claim 1 characterized by performing the revolution of changing moved in a counter clockwise direction in the revolving shaft which slightly said 1st semiconductor chip stowage container with which said semiconductor chip was contained, and took it to the pocket shorter side at parallel, or the approach of acquiring. [location / where said 1st pocket and said 2nd pocket overlap] [to the pocket long side] [in the direction of a left hand]

[Claim 4] Reversal moving the semiconductor chip according to claim 2 or 3 characterized by making the relative amount of gaps with said 1st and 2nd pockets into more [0.2mm - about 0.3mm] amounts than the die length of the taper section of a pocket, or the approach of acquiring.

[Claim 5] Reversal moving the semiconductor chip according to claim 2 or 3 characterized by the die length of the taper section of said pocket setting said amount of gaps to 0.5mm to the tray of the configuration in the range which is 0.1mm - 0.3mm, or the approach of acquiring.

[Claim 6] reversal moving the semiconductor chip according to claim 1 characterized by considering as the range which removes from the condition of having piled up said 1st semiconductor chip stowage container and said 2nd semiconductor chip stowage container, and boils 180 degrees - 225 degrees of angles of rotation, or the approach of acquiring.

[Claim 7] Reversal moving the semiconductor chip according to claim 5 characterized by taking the include angle of said revolution of changing to move at 200 degrees, or the approach of acquiring.

[Claim 8] How to acquire [reversal moving the semiconductor chip according to claim 7 characterized by giving an oscillation to a stage, or] from a pocket long side at the time of the revolution actuation termination of changing which said semiconductor chip moves.

[Claim 9] The device in which the 1st semiconductor chip stowage container with which the semiconductor chip was contained, and the 2nd semiconductor chip stowage container said whose semiconductor chip is not contained are piled up, and where said each semiconductor chip stowage container is piled up, it obtains [reversal moving semiconductor chip moving or the semiconductor chip characterized by having the device in which rotation which obtains is performed, or], and it equips.

[Claim 10] It has the 1st horizontally movable stage and the 2nd stage movable in the direction of a vertical, and it obtains [reversal moving the semiconductor chip according to claim 9 characterized by adjusting said superposition on said the 1st stage and said 2nd stage or], and equips.

[Claim 11]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the equipment used for the approach and this which are collectively reversed to an empty tray and remove the semiconductor chip (IC chip is called hereafter) in a receipt condition in a semiconductor chip stowage container (a tray is called hereafter).

[0002]

[Description of the Prior Art] Moving IC chip or ** has been performed by doubling the location of tray pockets and rotating it 180 degrees as an approach of IC chip in the tray receipt condition to the former being reversed and put in block to an empty tray, and removing it to it. The reason which had adopted such an approach is that it needed to carry out front flesh-side reversal of the IC chip contained by usually turning a front face up since it may ship by turning the rear face of IC chip up at the time of shipment in order to conduct rear-face visual inspection which guarantees dicing conditions, such as KAKE of IC chip, and a crack.

[0003] About IC chip with a big chip size, since the pulse duty factor of IC chip within a tray pocket is large, even if it piles up metaphor pockets, a revolution of IC chip does not arise in the space. therefore - - since it carried out certainly about front flesh-side reversal, if there is no location gap of a pocket -- the pocket from a pocket -- it removed and has **(ed). Therefore, the location of pockets could be piled up by laying trays on top of accuracy using a fixture, and the method of performing moving or ** of reversal of a front flesh side by turning this over has been performed by the help.

[0004] However, in the space which piled up and piled up pockets about the micrified chip, since IC chip became pivotable, even if it performed reversal moving or ** of the front flesh side of IC chip which makes accuracy double and rotate the location of pockets, much IC chips which cannot reverse a front flesh side correctly generated it. For this reason, front flesh-side reversal moving or ** was completed by correcting IC chip which woke up the defect of front flesh-side reversal by the help.

[0005]

[Problem(s) to be Solved by the Invention] However, in reversal moving the conventional IC chip or the approach of acquiring, it being difficult to lay the appearance of a tray on top of the pocket and empty pocket containing IC chip, and accuracy in the case of the pocket alignment of two trays for a ***** reason, and not depending on a tray, but performing this alignment about all pockets had the trouble of being very difficult.

[0006] Even if it furthermore takes out and lays the location of pockets on top of accuracy, IC chip shorter side die length becomes short, and shorter side die length approaches the thickness of tip, and sets for the chip of a rectangle with a still long long side. Since the space which piles up pockets and is made has only the possible volume in IC chip rotating with a shaft parallel to a long side, As for IC chip, ** produces ** within a pocket between the revolution actuation of changing which the force of restricting the position of IC chip does not commit and to move. It had the trouble of causing poor front flesh-side reversal, such as removing and some IC chips not being behind reversed and becoming ***** , and the poor receipt which IC chip is applied to the taper section and the edge section of a

pocket, and do not enter thoroughly in a pocket further.

[0007] Moreover, chip shorter side die length approached chip thickness, the incidence rate increased [in / in a chip long side / the very long rectangle chip] compared with the shorter side, and this activity that removes and corrects a defect's chip to a right position took big time amount to these defects that changing moves in connection with a chip size micrifying, and they had the trouble that the manday of correction had to be taken.

[0008] Then, in case an empty tray is made to carry out front flesh-side reversal and this invention removes IC chip which is in a receipt condition in a tray to it, it does not depend on the configuration of a chip but aims at offering the equipment which realizes the approach and it which ensure front flesh-side reversal and a pocket is made to carry out full receipt about all IC chips in a tray.

[0009]

[Means for Solving the Problem] The approach of reversal moving the semiconductor chip of this invention, or acquiring, in order to solve the above-mentioned technical problem The 1st pocket of the 1st semiconductor chip stowage container with which the semiconductor chip was contained, So that said semiconductor chip may counter the 2nd pocket of the non-contained 2nd semiconductor chip stowage container Superposition, By rotating the whole, it is reversal moving [which removes receipt of said semiconductor chip] a semiconductor chip, or the approach of acquiring, and is characterized by performing the revolution of changing which said semiconductor chip moves where ZURA [said 1st pocket and said 2nd pocket] slightly.

[0010] Moreover, in reversal moving said semiconductor chip or the approach of acquiring, it is characterized by performing the revolution of changing which moves said 1st semiconductor chip stowage container with which said semiconductor chip was contained in the direction of clockwise in the revolving shaft which slightly, and was taken to the pocket shorter side at parallel. [location / where said 1st pocket and said 2nd pocket overlap] [to the pocket long side] [in the direction of a right hand]

[0011] Or in reversal moving said semiconductor chip or the approach of acquiring, it is characterized by performing the revolution of changing which moves said 1st semiconductor chip stowage container with which said semiconductor chip was contained in a counter clockwise direction in the revolving shaft which slightly, and was taken to the pocket shorter side at parallel. [location / where said 1st pocket and said 2nd pocket overlap] [to the pocket long side] [in the direction of a left hand]

[0012] In reversal moving said said semiconductor chip or the approach of acquiring, it is desirable to make the relative amount of gaps with said 1st and 2nd pockets into many [0.2mm - about 0.3mm] amounts from the die length of the taper section of a pocket.

[0013] Or it is desirable that the die length of the taper section of said pocket sets said amount of gaps to 0.5mm to the tray of the configuration in the range which is 0.1mm - 0.3mm.

[0014] moreover, in reversal moving said semiconductor chip or the approach of acquiring, it is characterized by considering as the range which removes from the condition of having piled up said 1st semiconductor chip stowage container and said 2nd semiconductor chip stowage container, and boils 180 degrees - 225 degrees of angles of rotation.

[0015] Or it is characterized by taking the include angle of said revolution of changing to move at 200 degrees.

[0016] And it is characterized by giving an oscillation to a stage from a pocket long side at the time of the revolution actuation termination of changing which said semiconductor chip moves.

[0017] Moreover, in order to solve the above-mentioned technical problem, it is characterized by obtaining [reversal moving the semiconductor chip of this invention, or], and having the device in which rotation which obtains [semiconductor chip moving or] is performed, where said each semiconductor chip stowage container is piled up, the device in which equipment piles up the 1st semiconductor chip stowage container with which the semiconductor chip was contained, and the 2nd semiconductor chip stowage container said whose semiconductor chip is not contained, and.

[0018] Moreover, it is characterized by said to semiconductor chip reversal move or obtaining, having the 1st horizontally movable stage and the 2nd stage movable in the direction of a vertical in equipment,

and adjusting said superposition on said the 1st stage and said 2nd stage. Moreover, it is characterized by attaching an air cylinder as a device said semiconductor chip reversal moving or for obtaining and giving the oscillation from a long side to a semiconductor chip in equipment.

[0019]

[Function] If front flesh-side reversal moving the above IC chips or ** is performed, after beginning revolution actuation, while rotating to near 90 degree, IC chip will be slid down to the tray pocket bottom by work of a self-weight. If a revolution furthermore progresses, IC chip will move into the pocket of an empty tray with a revolution, hanging the soffit on the pocket edge of an empty tray. Since the end of IC chip is hung on the pocket edge, and the force in which ** stops ** is given to IC chip, IC chip prevents causing poor front flesh-side reversal, such as becoming ***** in which a flesh side does not have ****. By the time the revolution amounted to 180 degrees, after IC chip has run aground on the pocket edge, front flesh-side reversal is completed, and it is moved to an empty pocket. If a revolution progresses exceeding 180 more degrees, IC chip which the force by gravity lengthened caudad came to work for IC chip, and has run aground on the pocket edge will be slid down, and will be contained in a pocket.

[0020] Moreover, it is made to contain in a pocket certainly by giving an oscillation at the time of revolution termination about IC chip to a pocket edge which it runs aground and an amount was not able to contain in the pocket only by revolution greatly.

[0021]

[Example] The example of this invention is explained to below by making it reference in a drawing.

[0022] Vacuum adsorption is carried out in the tray standing ways 3, and the 1st tray 2 which contained the IC chip 1 in drawing 1 is held on the stage 4. Vacuum adsorption is similarly carried out about the 2nd empty tray 5 in the tray standing ways 6, and it is held on the stage 7. Parallel of the 1st and 2nd trays 2 and 5 are doubled by installation to the stages 4 and 7 of the tray standing ways 3 and 6. The stage 4 of a horizontal direction and a stage 7 is movable respectively in the direction of a vertical, by adjusting the halt location of a stage 4, positioning of superposition can do the 1st tray 2 and the 2nd empty tray 5, and thereby, indirectly, can take out a location and can pile up the 1st pocket 8 and the 2nd pocket 9. Where the 1st tray 2 and the 2nd tray 5 are piled up, the 1st stage 4 and the 2nd stage 7 are pivotable at the hand of cut and angle of rotation of arbitration, by this revolution, the 2nd pocket 9 is made to carry out front flesh-side reversal, and the IC chip 1 is removed from the 1st pocket 8 to it. In order that ** in the space where the IC chip 1 is built by the 1st and 2nd pockets 8 and 9 may make it hard to happen **, the revolving shaft is taken to the shorter side of the 1st and 2nd pockets 8 and 9, and parallel.

[0023] In the example shown in drawing 2, the halt location of the horizontally movable stage 4 is adjusted, it moves rightward [of a pocket long side / 10] on a stage 4 from the location which doubled and piled up the location of the 1st pocket 8 and the 2nd pocket 9, and the core of a pocket is ZURA and piled up slightly. After the IC chip 1 has run aground on the pocket edge 12 of the 2nd tray 5 like drawing 3 by making the clockwise hand of cut 11 rotate 180 degrees of this whole, it is dedicated to the 2nd pocket 9. Front flesh-side reversal is completed about all the IC chips 1, without causing a condition, a ***** condition, etc. which are produced when the IC chip 1 rolls within the 1st and 2nd pockets 8 and 9 during the revolution of changing to move and which are not reversed. Moreover, when and a direction is taken leftward to a pocket long side, the front flesh-side reversal condition that the IC chip 1 runs [make] aground on the pocket edge 12 can be built with taking the hand of cut which changing moves counter clockwise.

[0024] In the example shown in drawing 4, moving the picking IC chip 1 or ** is performed for angle of rotation from the condition of drawing 2 $R > 2$ which the pocket location and piled up the 1st and 2nd trays 2 and 5 more greatly than 180 degrees. By carrying out the revolution of 180 degrees or more, the IC chip 1 which had run aground on the pocket edge 12 by drawing 3 is slid down from the pocket edge 12 by work of a self-weight, and is contained in the 2nd pocket 9. The force in which it dedicates the IC chip 1 in the 2nd pocket 9 can be more greatly acquired by taking larger angle of rotation which changing moves from 180 degrees. moreover -- from [that the include angle from the level surface is

given to the IC chip 1] -- sliding down -- being easy -- the pocket edge 12, although it can run aground and can move also about the IC chip 1 with a large amount In case the IC chip 1 slides down into the 2nd pocket 9 from the pocket edge 12, it is begun to start poor front flesh-side reversal, such as ***** depended for it becoming impossible to maintain a front flesh-side reversal condition, and rolling, from the hit where angle of rotation which changing moves exceeds 225 degrees. For this reason, it removes, angle of rotation is carried out to 225 degrees at the maximum, and it considers as the thing which can slide down the IC chip 1 from the pocket edge 12 within the limits of this and which it runs aground, and a pocket location an amount, and is built with an amount.

[0025] Moreover, when 180 degrees of revolutions of changing moved from the condition of drawing 2 of having taken the gap direction rightward are rotated in the counter clockwise direction, the clockwise hand of cut 11 removes how to the pocket edge 12 of the IC chip 1 to have been ridden, and it becomes drawing 3 and the opposite hand which are in a next condition. Although it runs aground on the pocket edge 12 temporarily in case the IC chip 1 moves within the 1st pocket 8 by counter clockwise revolution actuation and it moves to the 2nd empty pocket 9, while advancing a revolution further, it is slid down in the 2nd pocket 9. For this reason, the force which it is going to store in the 2nd pocket 9 even if it advances a revolution further after this about the IC [being unable to contain in the 2nd pocket 9 by the revolution to the pocket edge 12 which it runs aground, and an amount is large and is 180 degrees, but having run aground on the pocket edge 12] chip 1, since [to the pocket edge 12] it rides and a riser is in an opposite hand with drawing 3 is not acquired, and it cannot contain in the 2nd pocket 9. Moreover, since [in the counter clockwise direction] it sets to remove and the front flesh-side reversal activity of the IC chip 1 and a receipt activity into the 2nd pocket 9 are done almost simultaneous, in case the IC chip 1 moves from the 1st pocket 8 to the 2nd pocket 9, possibility of being in an unstable condition and rolling about a minute chip arises.

[0026] In the example shown in drawing 5 , an oscillation is given [of the IC chip 1] from a long side in the condition that the revolution actuation of changing to move is completed and the 1st and 2nd trays 2 and 5 still pile up. a pocket -- ZURA -- since the IC chip 1 made runs aground and there is dispersion in an amount, what cannot finish carrying out receipt into a tray pocket only by the work of a self-weight run aground and according to the revolution of 180 degrees or more in the inside of the IC chip 1 with a large amount by the pocket edge 12 remains. In order to contain these IC chips 1 in a pocket, the IC chip 1 can be moved slightly by giving the oscillation from a longitudinal direction 14 to the IC chip 1 at the time of revolution termination, and it can slide down in the 2nd pocket 9. The air cylinder 13 is used as a device in which this oscillation is given here, and the oscillation is given to the IC chip 1 by knocking at a stage 7 several times. Moreover, control of amounts, such as earliness, can carry out easily in the strength of an oscillation by having used the air cylinder 13.

[0027] Drawing 6 shows the condition that the 1st pocket 8 has shifted rightward to the 2nd pocket 9. After starting the revolution of changing to move before 90 degrees rotates, the IC chip 1 moves downward within the 1st pocket 8 by work of a self-weight. For this reason, in order to make the pocket edge 12 run aground and to remove the end of the IC chip 1 to the 2nd pocket 9, and it is necessary to take the larger amount 15 than the pocket taper section die length 16. [to the 2nd pocket 9 of the 1st pocket 8] It becomes difficult to slide down in the 2nd pocket 9 by revolution 180 degrees or more, using the self-weight of the IC chip 1, when [to the pocket edge 12] it runs beyond the need aground although it needed to run aground and the amount needed to be taken 0.2mm - about 0.3mm or more, and an amount is taken in order to stabilize a position so that ** may not start **, in case the IC chip 1 is moved to the 2nd pocket 9, and to carry out front flesh-side reversal. in order [to the pocket edge 12 of the future and IC chip 1] to run aground and to take an amount 0.2mm - 0.3mm -- the 1st pocket 8 and the 2nd pocket 9 -- relative -- and an amount larger 0.2mm - about 0.3mm than the pocket taper section die length 16 is made into ZURA ***** for an amount 15. front flesh-side reversal moving the IC chip 1 using some kinds of 1st and 2nd trays 2 and 5 of the range whose taper section die length 16 is 0.1mm - 0.3mm in this example -- obtaining -- receiving -- ZURA -- an amount 15 -- ** -- front flesh-side reversal of the IC chip 1 can be performed, without shifting by taking by the difference in the class of the 1st and 2nd trays 2 and 5, and adjusting an amount 15. Moreover, the IC chip 1 with which angle of

rotation ran aground on the pocket edge 12 even at 200 degrees at this time is mostly slid down in a pocket 9, and in the revolution after it, since the effectiveness which contains the IC chip 1 into the 2nd pocket 9 is hardly acquired, it makes 200 degrees angle of rotation which changing moves when the 1st and 2nd trays 2 and 5 and an amount 15 is taken to 0.5mm.

[0028] Drawing 7 is obtained [IC chip table flesh-side reversal moving or], and expresses equipment typically. The stage 4 holding the 1st tray 2 which contained IC chip is attached in the guide 18 with which it was horizontally covered at the revolution base 17. On the other hand, the stage 7 holding the empty tray 5 is attached in the guide 19 with which it was covered in the direction of a vertical. These stages 4 and 7 are moved in a horizontal direction and the direction of a vertical by cylinders 20 and 21. For this reason, by changing the halt location of a stage 4, the 1st and 2nd trays 2 and 5 explained by drawing 6 , an amount 15 can be adjusted, and adjustment of the IC chip 1 explained by drawing 5 through which it passes pocket edge 12 and which it runs aground and is an amount can be performed. A motor 22 rotates the revolution base 17 in the condition of having piled up the 1st and 2nd trays 2 and 5, moves the IC chip 1, and is a frog. Reth the hand of cut and angle of rotation which are moved by this motor 22 are set up, and also poor deed table flesh-side reversal is smoothly prevented for the 1st and 2nd pockets 8 of the IC chip 1, and delivery between nine by controlling the speed. A cylinder 13 makes the 2nd pocket 9 contain the IC chip 1 which knocked at the stage 7 at the time of the rotation termination of changing which is for giving an oscillation to the IC chip 1, and is moved, and has run aground on the pocket edge 12.

[0029]

[Effect of the Invention] This invention brings about effectiveness which is described below by front flesh-side reversal moving IC chip which was explained above, or the approach of acquiring.

[0030] By ZURA and piling up tray pockets, in the case of the revolution of changing to move, since it runs aground on a pocket edge, ** can be stopped, and IC chip is removed, and ** within a pocket can arrange the field of IC chip in a next pocket certainly, and can carry out front flesh-side reversal of it.

[0031] By taking larger angle of rotation which changing moves than 180 degrees, IC chip which ran aground on the pocket edge of a tray is slid down in a pocket, and is contained.

[0032] Furthermore, all can be compulsorily contained in a pocket about IC chip to a pocket edge which it runs aground and an amount was not able to contain only in revolution actuation greatly by giving the oscillation from a longitudinal direction to a tray at the time of revolution termination.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing showing the condition of having doubled and piled up the pocket location to the former.

[Drawing 2] Drawing showing the condition of having ZURA and piled up the pocket location in this invention.

[Drawing 3] Drawing showing the example rotated 180 degrees from the condition of drawing 2 of this invention.

[Drawing 4] Drawing showing the example rotated 180 degrees or more from the condition of drawing 2 of this invention.

[Drawing 5] Drawing showing the example which gives an oscillation after the revolution termination of changing in this invention to move.

[Drawing 6] Drawing which expanded and expressed the gap condition of the pocket of this invention.

[Drawing 7] IC chip table flesh-side reversal moving in this invention, or drawing in which obtaining and showing the configuration of equipment.

[Description of Notations]

1 IC Chip

2 1st Tray

5 2nd Tray

3 Six Tray standing ways

4 Seven Stage

8 1st Tray Pocket

9 2nd Tray Pocket

10 Right of Pocket Long Side

11 Clockwise Hand of Cut

12 Pocket Edge

13 Cylinder for Knock

14 Longitudinal Direction

15 ZURA -- Amount

16 Taper Section Die Length

17 Revolution Base

18 19 Guide

20 21 Cylinder

22 Motor

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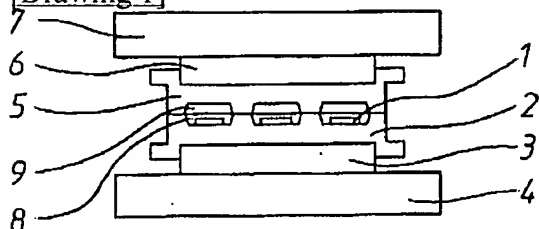
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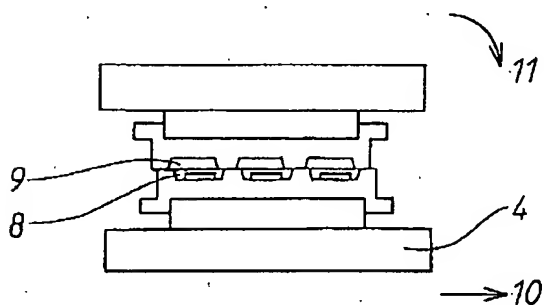
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DRAWINGS

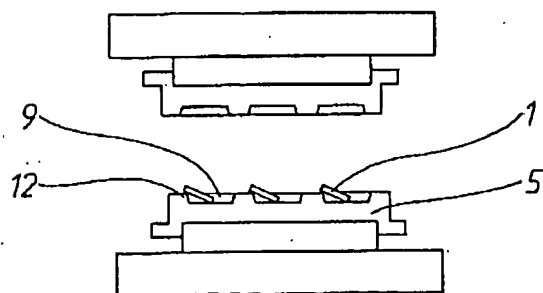
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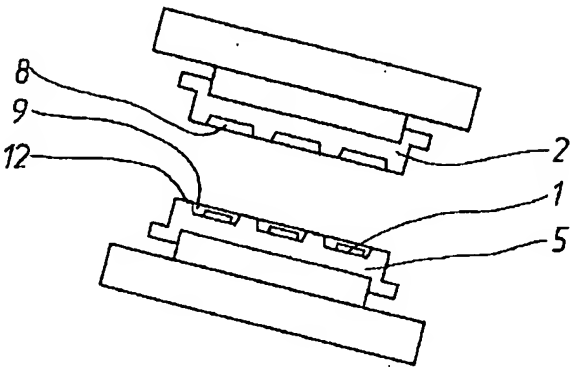
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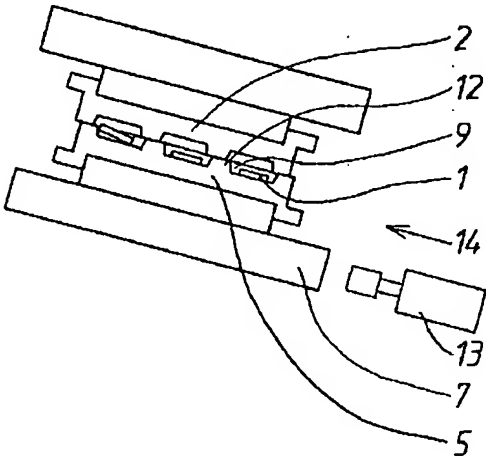
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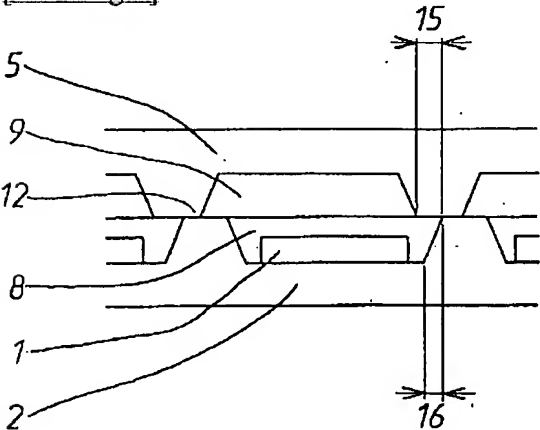
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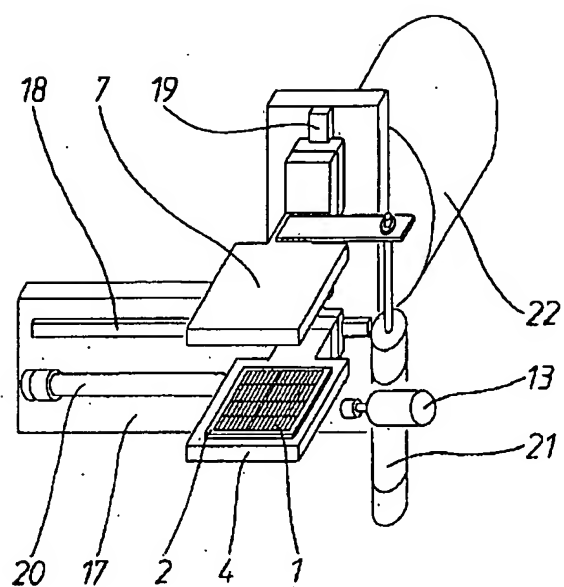
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]